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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

SECRET

SECURITY INFORMATION

COUNTRY	USSR (Sverdlovsk Oblast)	REPORT NO.	[redacted] 25X1A
SUBJECT	Characteristics of the Single Anode Pot-B500	DATE DISTR.	25 August 1953
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[redacted]

1. The chief engineer in the mercury vapor rectifier department in Zavod 659 was Vadim Konstantinovich Krapivin. He had worked in the General Electric and Westinghouse plants in America during 1942 - 1944. As a result of this experience, the rectifiers were copies of the American models of that date.

2. Krapivin and four of his assistants were awarded the Stalin Prize in 1951 for their work in the rectifier department.

25X1X 3. [redacted] rectifier development in the USSR has reached a stage about equal to that of Germany in 1946.

4. One production item in short supply was iron with satisfactory magnetic properties for use as cores in relays and choke coils.

25X1A 5. [redacted] sketched below the essentials of the latest large rectifier that was manufactured (see page 3).

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TECHNICAL CHARACTERIZATION OF THE SINGLE ANODE POT B 500

6. Important characteristics of the single anode Pot B 500 are as follows:

a. When used for electrolysis at 825 volts, the average current per cylinder is 500 A; six cylinders in parallel give 3000 A. When used for railway electrification the same type emits 3300 volts with average current of 166 amperes. One hundred per cent voltage regulation is possible at 825 volts through grid control; at 3300 volts only 10 per cent voltage regulation is possible. 25X1A

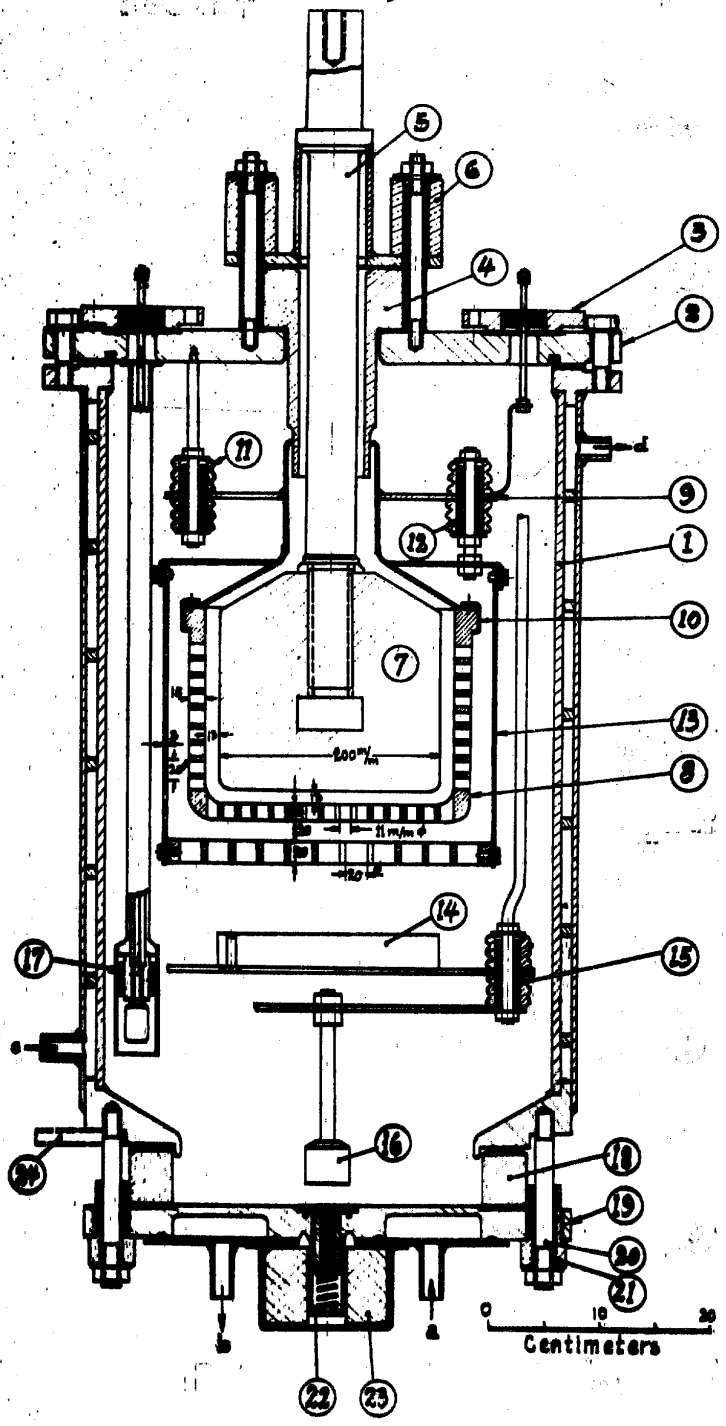
b. The most favorable exit cooling water temperature is 36 to 42° C. The operating potential drop at 3000 amperes is about 23 volts. The exciter is a controlled two-phase alternating transformer with an average current of 13 amperes. Only the inner grid is controlled, the outer remains potential free.

c. The pots are joined in groups of 6 or 12 and are serviced by a common fore vacuum pump (25), a mercury vapor diffusion pump (26), a McLeod (27), and a common vacuum cock (28) [see page 6]. Each pot is joined to the common vacuum system (31) by an elbow (29) and vacuum cock (30). Between the fore pump and the mercury diffusion pump there is a vacuum tank (32). Connections for the control grid, the firing, and the excitation are all brought out to the connection block (33). Although the reliability of the rectifier itself is considerably less than that of the corresponding American or West European rectifier, the use of quickly switching anodes makes it very reliable.

PAGE 3: Description of the Single Anode Pot B-500 (Rectifier) with Legend.

PAGE 6: Bank Arrangement of the B-500 Rectifier.

25X1A



SINGLE ANODE POT - B 500 RECTIFIER
Mass produced at Zavod Ural Elmash
SVERDLOVSK - USSR (July 1952)

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LEGEND

THE SINGLE ANODE POT - B-500 (RECTIFIER)

1. Double walled vessel with welded iron spiral water guide, 10 x 10 mm. square, for cooling.
   a - water inlet
   d - water outlet

2. Cover perforated in center by anode sleeve; five auxiliary leads pass through the periphery - excitation (two); ignition; control grid (internal); and deionizing grid (external).

3. Auxiliary (five) lead-ins--insulated with melted-in glass plugs. Flange is sealed from cover by rubber gasket.

4. Anode insulated by porcelain and rubber gasket.

5. Anode bolts with anchoring flange.

6. Porcelain insulators (six) for insulating the anode lead in mounting.

7. Main anode made of graphite.

8. Gridcage (graphite).

9. Gridcage holder.

10. Two-piece ring for fastening the gridcage.

11. Porcelain insulators for insulating the suspension of the gridcage mountings from the pot cover; (three) distributed on the periphery.

12. Mounting of the deionisation grid by insulators (3--distributed on the periphery).

13. Deionisation grid consists of perforated iron (?) cylinder and graphite plate.

14. Shield of graphite.

15. Supporting device for shield and ignition anode; suspended at three points; two suspensions are constructed as in (sketch) 15. Three suspensions are between the sleeves of the excitation anodes.

16. Ignition anode (graphite).

17. Exciter anode (two, 120 mm. separation). The two tubes are joined by straps at top and bottom. At the lower strap parts (14), (15), and (16) are fastened by means of insulators.

18. Cathode insulator of porcelain sealed with rubber packing.

19. Cathode base plate with water cooling inlet at "a", outlet at "b". From "b" the water is carried to "c" by means of a rubber tube.

20. Anchor bolts for the cathode plate; through insulating sleeves (21); six arranged around the periphery.

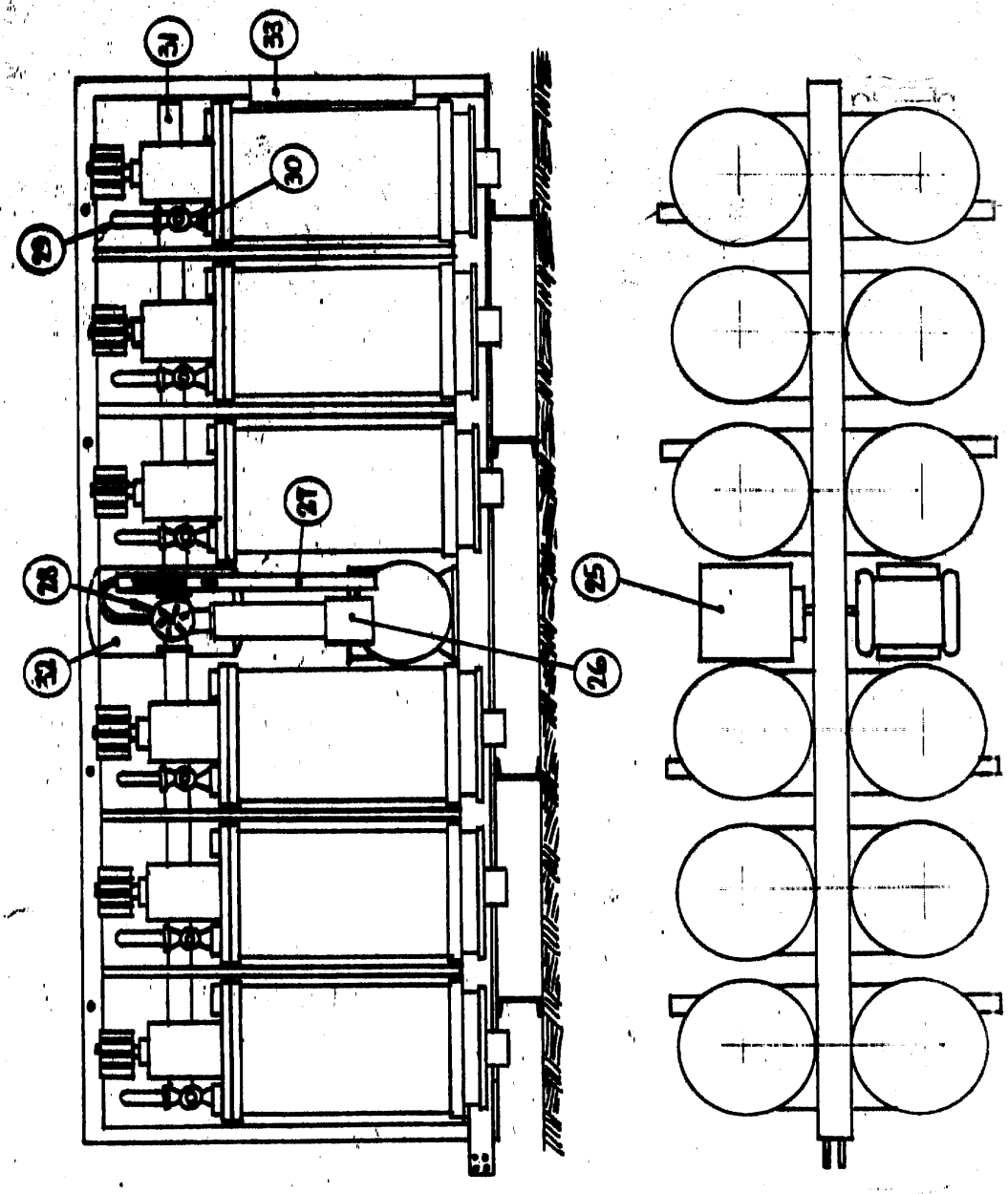
25X1A

21. Insulating sleeves.

22. Firing spray.

23. Solenoid for operating the firing spray (220 V: 20 A).

24. Fastening plate.



BANK ARRANGEMENT of B-500 MERCURY VAPOR RECTIFIERS Scale 1:20